Steroid Induced Psychosis in an Asthmatic Child: Case Report & 10 Year Literature Review

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Summary

We report the case of an 8-year-old boy with asthma who presented with psychotic symptoms that appear to be induced by corticosteroids. This case adds to a small but growing body of evidence supporting the incidence of steroid induced psychiatric symptoms in pediatric populations.

Corticosteroids have been used effectively for years to treat a wide variety of both acute and chronic medical conditions. Some of the well known side effects include growth retardation, gastrointestinal bleeding, edema, fluid and electrolyte imbalance, skin changes, vertigo, seizures, endocrine disturbances, osteoporosis, cataracts, and immune suppression (Lee, KM et al, 2001). The association of occasional psychiatric disturbances with the use of corticosteroids has been established and well documented in the adult population. There have been, however, very few reports citing similar occurrences in children. We suggest that the prevalence of this phenomenon might be significantly higher than has been reported in the current literature and that issues pertaining to both management and prophylaxis remain unexplored. We therefore present the following case of an 8-year-old asthmatic child who experienced what appeared to be a steroid induced psychosis.

Case Report

An 8-year old previously healthy, Caucasian male presented to his family doctor with respiratory complaints. Examination and testing revealed diagnoses of asthma and sinusitis. The patient was started on Cephalexin, oral Prednisone 50 mg once a day, Pulmicort (glucocorticosteroid) and Nasonex (intranasal steroid). The respiratory symptoms settled within a few days of treatment. On Day 5 of treatment, he reported visual disturbances, specifically claiming that "ladies noses looked weird". He cried when he listened to certain songs and felt that he was becoming like his grandmother, who had a known senile dementia. The following day the child was noted to be depressed stating that he wished he had never been born and wanted to die, claiming that he thought he should serve the devil. The child also experienced apparent hallucinations, seeing women dancing in grass skirts. He felt suspicious about his relatives and thought they were lying to him. These symptoms persisted and did not fluctuate throughout the day. It was reported that he was fully aware of time, place, and person.

On Day 7 he was taken to his family doctor in his hometown, 300 miles from our hospital. The family doctor noted that the boy's mental state showed an "alert" boy with "hallucinations and delusions" as described above. The EEG was normal. Physical exam, complete blood count, urine, and blood chemistry were all normal. The family doctor elected to stop the steroids but continue the antibiotic. He did not treat the psychotic symptoms with neuroleptics or other medications. It was reported that the hallucinations and delusions resolved over the next two days.

On Day 10 the parents brought the boy into our hospital to have him "checked over". The physical exam was normal. When we were asked to review him, his mental state exam revealed an alert, articulate and cooperative young boy who interacted warmly with both parents. His thought form and content were normal with no evidence of hallucinations or delusions. His mood was subjectively "down" but objectively normal. He had no suicidal or homicidal ideation. His attention, concentration and orientation were totally normal. His cognitive functions including memory were normal. When asked about his feelings on his recent symptoms he answered "that must have been my asthma drugs".

His past medical history was noncontributory with the exception of the asthma and sinusitis. His developmental history was normal and the family history was negative with the exception of dementia in the paternal grandmother.

On a two-week follow-up visit, his parents reported that the boy was back to his normal level of functioning and his mental state exam was completely normal.

Discussion

Reviewing the case with our medical students sparked their interest, and a medline search of the literature for the past 10 years was done using key words psychosis, steroids, pediatric and iatrogenic. This search yielded relatively few relevant reports on this subject. The following information and discussion is based on these reports.

As noted previously, glucocorticoids have a generalized effect on cerebral blood flow, oxygen consumption and brain excitability (DeKloet et al, 1985). Because of the secondary effects that these endogenous chemicals seem to have on neurotransmitters, there has been specific research on the effects of steroids on monoamine levels. Of particular interest is the proven increase in dopamine levels exerted by high levels of glucocorticoids and the psychiatric implications that these elevated dopamine levels can have (Wolkowitz et al, 1986, Schatzbert et al, 1985). Conversely, steroids have also been linked with decreased peripheral and central serotonin secretions (Beshay,1998). The relative importance of each of these findings is difficult to assess because of the biochemical interplay between these two neurotransmitters. It has been demonstrated that serotonergic afferent neurons are direct inhibitors of dopamine release at dopaminergic axons (Carpenter, 1995). Both these correlations may also have implications with regard to possible prophylaxis of steroid psychosis (Bloch, 1994).

There has been no consistency in the literature reviewed regarding the nature of symptoms elicited secondary to high levels of steroid use. Documented cases show evidence of a full spectrum of mood disorders ranging from depression to mania, as well as symptoms consistent with a brief psychotic disorder. Moreover, the cases described in the literature tend to be those concerned with a

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more profound psychiatric disturbance. We suggest that due to the wide spectrum of severity and the transient nature of the symptoms, it is conceivable that many milder or more rapidly resolving cases do not come to medical attention and therefore do not get reported.

The treatment and prophylaxis of steroid induced psychosis in the pediatric population has not been well studied. Because of the previously mentioned effects of steroids on serotonin level, it is interesting that SSRI's have been used as therapeutic agents in one case. The successful use of sertraline in the treatment of a 12-year old Caucasian boy who presented with psychosis and depression following treatment with high dose prednisone has been reported (Beshay,1998). We were unable to find studies that demonstrated successful treatment of steroid induced psychosis with SSRI's in the absence of mood symptoms. Whether or not the primary benefit in the cited case was due to the alleviation of the mood symptoms is not well understood.

Obviously, one of the first line treatments for a steroid induced psychotic episode would be simple withdrawal of the offending agent. In some cases this has proven sufficient in reversal of symptoms, as happened in our case. Dawson and Carter (1998) report the case of an 8-year -old female who met the DSM IV criteria for a "brief psychotic disorder" following administration of nasal corticosteroid spray and oral prednisone for the treatment of an asthma exacerbation. The patient received 20mg prednisone BID over 2 days (total of 4 doses) after which it was discontinued due to the development of psychotic symptoms. The symptoms were refractory to treatment with diazepam 5mg orally. However, symptoms began to resolve spontaneously within 48 hours following cessation of the prednisone, and the child was completely back to premorbid functioning within 5 days. Another example showed reversal of symptoms following reduction of steroids as was reported by Lee et al (2001) in a case report involving a 5-year-old girl. In this instance, high dose IV methylprednisolone (40 mg IV q6h) was given for an asthma exacerbation and the resulting psychotic reaction resolved a few hours after reducing this dose to 20 mg IV q6h.

Sutor et al (1996) reported an interesting case of severe psychotic depression induced by steroids in a 15-year-old girl with acute lymphoblastic leukemia. Because she had a previous life threatening adverse reaction when treated with neuroleptics for nausea, her physicians were reluctant to treat her psychosis with neuroleptics. Two weeks after her steroids were discontinued, her psychosis responded rapidly to electroconvulsive treatments and her oncologist no longer included steroids in her chemotherapy regimen.

A case of successful treatment of steroid induced psychosis with Risperidone, has been reported Kramer & Cottingham (1999). A 14-year-old girl developed psychosis after taking high dose dexamethasone 24 mg per day times 25 days, in her second intensification regimen for acute lymphoblastic leukemia. Nine days after discontinuing steroids, her symptoms had not improved. Within three days of treatment with Risperidone 1mg hs, her symptoms began to improve and by three weeks her symptoms had completely resolved.

The risks of steroid treatment in a 13-year-old girl with known bipolar illness were reported by Mesurolle et al (2002). Her manic psychosis reappeared during a three day treatment with methylprednisolone 32 mg per day. The steroids were used before she underwent contrast –enhanced CT of the head, since she had a history of adverse reaction to contrast material. Her symptoms responded to haloperidol and lithium.

Conclusion

The case report presented here, as well as the limited but compelling body of evidence we were able to collect on the subject, highlights what is a rather important iatrogenic phenomenon. As previously mentioned, the effects of steroids on mental status in adults have been well documented in the published literature but this does not appear to carry through to the pediatric literature. Indeed, this may be partly due to the relatively greater occurrence of this phenomenon in adults because of the more frequent use and often higher dosing of corticosteroids in this population. However, it is quite conceivable that subtle mood disturbances and even mild psychotic symptoms often go unreported in children due to both their rapid reversal and the seemingly benign nature of many behavioural outbursts in children, to the untrained eye. Since the disturbances discussed here are iatrogenic and often quite preventable with cautious use of the agents in question, it would behove clinicians to be aware of this rather unexplored complication in clinical practice. Further research is certainly needed to study the relative efficacy of various treatments both prophylactically as well as in the event of the occurrence of a steroid-induced psychiatric disturbance in the pediatric population.

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